

ISS Additive Manufacturing Facility for On-Demand Fabrication in Space, Phase I

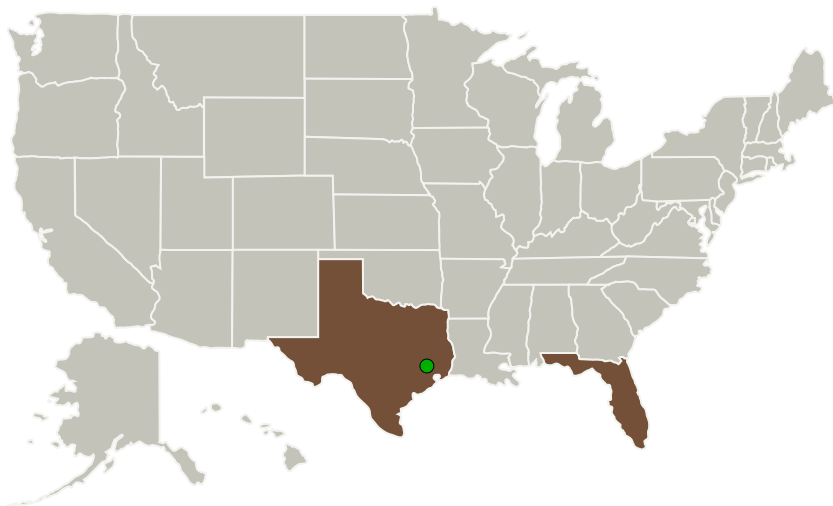
Completed Technology Project (2012 - 2012)



Project Introduction

The ability to manufacture on the International Space Station will enable on-demand repair and production capability, as well as essential research for manufacturing on long-term missions. Having an Additive Manufacturing Facility (AMF) on the ISS will allow for immediate repair of essential components, upgrades of existing hardware, installation of new hardware that is manufactured, and the manufacturing capability to support commercial interests. Additive manufacturing is the process of building a part layer-by-layer, with an efficient use of the material. The process leads to a reduction in cost, mass, labor and production time. As part of this proposal, Made in Space, Inc., combined with the mission experience of Arkyd Astronautics, Inc. and NanoRacks, LLC, will develop an Additive Manufacturing Facility for the ISS that will enable on-board manufacturing capability. The crew would be able to utilize the AMF to perform station maintenance, build tools, and repair sections of the station in case of an emergency. The AMF will use an extrusion-based "3D printing" method, which Made in Space has already tested in zero-gravity with successful results (Summer 2011), and is scheduled to do sub-orbital testing in 2012 as part of NASA's Flight Opportunities Program. The first-generation AMF will be contained and operated in an 8U of the NanoRacks® payload system. It will be capable of producing components from a variety of space-rated composites. Later generations will have the ability to produce parts with space-grade metals. This versatility will allow for a variety of components and devices to be manufactured, enabling the mentioned uses to be applicable as well as unforeseen uses to be developed.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Made in Space, Inc.	Lead Organization	Industry	JACKSONVILLE, Florida
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Florida	Texas

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140267>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Made in Space, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

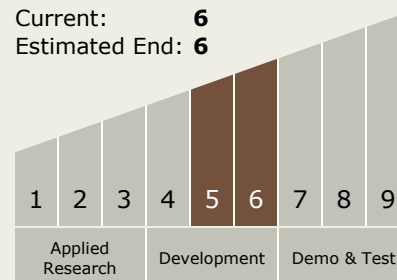
Carlos Torrez

Principal Investigator:

Michael Snyder

Technology Maturity (TRL)

Start: 5
Current: 6
Estimated End: 6



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Technology Areas

Primary:

- TX07 Exploration Destination Systems
 - └ TX07.2 Mission Infrastructure, Sustainability, and Supportability
 - └ TX07.2.4 Micro-Gravity Construction and Assembly

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System